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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,666	01/25/2002	Jonathan A. Nagel		4338

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EXAMINER	
VALENCIA, DANIEL E	
ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 07/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/057,666	NAGEL, JONATHAN A.	
	Examiner	Art Unit	
	Daniel E Valencia DV	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 January 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Brian Healy
Primary Examiner

DETAILED ACTION

Drawings

New corrected drawings are required in this application because the drawings are informal and have hand written numerals. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6, 8, 9, 13, 14, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Delavaux U.S. Patent No. 6,583,925. Refer to the appropriate drawings or parts of the specification. Delavaux discloses efficient pumping for rare-earth doped fiber amplifiers with all the limitations of the abovementioned claims. Regarding claim 1, Delavaux discloses a fault tolerant optical amplifier apparatus for amplifying transmission signals (fig. 7), said apparatus comprising: a first amplifier segment (72) having first and second ends, said transmission signals (Pin) propagating through said

first fiber segment; a first directional coupler (99) coupled to said first end of said first amplifying fiber segment; a first optical pump source (98) coupled to said first directional coupler, said pump source supplying pump (p1pump) to said first amplifying fiber segment such that a portion of said pump power remains after propagation through said first amplifying fiber segment (col. 5, line 50- col. 6, line 50); a second amplifying fiber segment (76) having a first and second ends; a second directional coupler (88) coupled to said first end of said second amplifying fiber segment; a second optical pump source (86) coupled to said second directional coupled, said pump source supplying pump power (Ppump) to said second amplifying fiber segment; a third directional coupler (90) coupled to said second end of said second amplifying fiber segment; a fourth directional coupler (96) coupled to said second end if said second amplifying segment; and a bi-directional optical connection (96 → 90 and vice versa) disposed between said third and fourth couplers, such that said portion of pump power remaining (Pres) after propagation through said first amplifying fiber segment is supplied to said second amplifying fiber segment via said third coupler, said bi-directional connection and said fourth coupler. Although Delavaux's reference does not explicitly state that the fiber amplifying fiber segments have two ends, this limitation is an inherent property of any optical fiber device. Delavaux's disclosure shows a portion of said pump power supplied to said second amplifying fiber segment (p1res) remains after propagation through said second amplifying fiber segment, said portion of said remaining pump power supplied to said first amplifying fiber segment via said third coupler (col. 6, lines 10-30), said bi-directional connection and said fourth coupler, as explained in claim 2.

With reference to claim 3, Delavaux discloses that the first pump (98) source supplies pump power to said first amplifying fiber segment in a co-propagating direction with respect to the propagation of said transmission signals through said first amplifying fiber segment. Delavaux's disclosure further shows that the second pump source is pumped in a counter-propagating direction with respect to the direction of the second set of signals (86), as mentioned in claim 6. As to claim 8, Delavaux discloses that the remaining pump power is supplied to the first fiber amplifier in a counter-propagating direction (p1res) with respect to the signal direction. Regarding claim 9, Delavaux's disclosure depicts that the remaining pump power is supplied to the second amplifying fiber segment in a co-propagating (Pres) direction with respect to the signal direction.

As to method claims 13, 14, and 17, the steps described in the claims would have been inherently carried out by using the device disclosed by Delavaux.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 5, 7, 10, 11, 12, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux. Refer to the appropriate drawings or parts of the specification. Delavaux as applied above, discloses an optical amplifier system with

essentially all the elements of the claimed invention; however, the reference does not explicitly state the use of a feedback control mechanism.

On the other hand, using a feedback circuit to control pump power is well known in the art of optical fiber amplifiers, as explained in claims 11 and 12. Therefore, one of ordinary skill in that art would recognize the advantages of adding a feedback control circuit to an optical amplifier in order to control the pump power.

Although the embodiment in figure 7 of Delavaux does not show (1) that the first pump is supplied in a counter propagating direction with respect to the first signal, (2) that the second pump source supplies pump power in a co-propagating direction with respect to the signal, (3) that the remaining pump power is supplied to the first amplifying fiber in a co-propagating direction, and (4) that the remaining pump power is supplied to the second amplifying segment in a counter propagating direction; pumping fiber amplifiers in co-propagating directions and counter-propagating directions are both well known in the art. Specifically, Delavaux teaches that it is advantageous to pump optical fiber amplifiers in both directions as seen in figures 5, 6, and 8. Additionally, Applicant claims different mutually exclusive embodiments with regards to the direction of the pump power. This would suggest that these limitations are simply design choices and are non-critical. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a feedback control circuit to control pump power and to pump the amplifiers in different directions.

Conclusion

The prior art documents submitted by the applicant in the Information Disclosure Statement filed on January 25, 2002, have all been considered and made of record (note attached copy of form PTO-1449).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kim U.S. Patent No. 5,815,308 discloses a bi-directional optical amplifier with two pumps corresponding to two amplifiers, wherein the residual pump energy propagates to the other amplifier.

Nakano U.S. Patent No. 6,542,290 discloses an optical amplifier with two amplification fiber segments with two corresponding pump sources.

Mollenauer U.S. Patent No. 5,058,974 discloses a distributed amplification for light wave transmission system with two amplifiers, a plurality of couplers, and corresponding pump sources.

Islam U.S. Patent Application Publication No. 2002/0176155 discloses a multistage optical amplifier with coupling means for re-directing pump light.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel E Valencia whose telephone number is (703)-305-4399. The examiner can normally be reached on Monday-Friday 9:30-6:00.

The fax phone numbers for the organization where this application or proceeding is assigned are (703)-308-7724 for regular communications and (703)-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

DEV
June 26, 2003

Brian Healy
Primary Examiner